## Arcus GIBB (PTY) LTD

# Environmental Impact Assessment for the Establishment of the Caledon Wind Farm, Western Cape Province

## Environmental Scoping Report

## HERITAGE ASSESSMENT

Date: October 2011

# EXECUTIVE SUMMARY

ACO Associates was appointed by Arcus GIBB (Pty) Ltd on behalf of the proponent to conduct a Heritage Impact Assessment of a number of farms positioned between Botrivier and Caledon in the Overberg area of the Western Cape. The total wind farm will be approximately 3500 hectares in extent, have a generating capacity of 300 MW and comprise 150 turbines installed in 6 phases. This HIA considers the first two phases with a total of 70 turbines.

The key Heritage Indicators are:

- Scatters of Early Stone Age material occur across many of the ploughed fields. They are not in context and are of low significance;

- There are 5 homesteads within the borders of the wind farm. Four are occupied while one is abandoned. The occupied farm houses have been modernised and retain little original fabric, they have low heritage significance. The early 20th century, abandoned, farmhouse (Klein Windheuwel) which is in a state of neglect, has medium significance;

- There is one early 20th century cemetery within the wind farm, at Klein Klipheuwel. It is close to the farmhouse and is not threatened by the development;

- The wind farm is located on either side of the R43 (a scenic route) to Villiersdorp. This is an important access route to the Riviersonderend Valley and the historic villages of Genadendal (Provincial Heritage Site) and Greyton. The proposed wind farm will also be visible from the Houw Hoek Pass, the N2, Caledon and Theewaterskloof. At least 19 turbines, which can reach a height of 120m with their blades, will be placed within 350m of the R43;

- The cultural landscape comprises typical Overberg wheat fields and pasture lands, characterised by rolling landscapes, ploughed lands and blue gum tree groves and wind breaks. The Riviersonderend Mountains, Groenland Mountains and Kleinrivier Mountains form an important backdrop to the agricultural lands. The most significant heritage impact will be of visual nature. The cumulative impact of four adjoining wind farms in the Caledon area will be high.

Possible mitigation measures:

- It is proposed that a photographic record of a limited collection of the ESA artefacts is undertaken as part of the EMP programme;

- No mitigation is proposed for the farmsteads. However, in order to prevent vandalism of the abandoned farmhouse of Klein Windheuwel, it is recommended that the house is fenced off during the construction phase. Alternatively, the developers may consider upgrading the structure for accommodation for the construction crews but this should be according to Heritage Western Cape guidelines for buildings over 60 years;

- No mitigation is required for the family graveyard. However, if burials are uncovered during the excavation for the turbines, access roads, etc then work should cease in that area and Heritage Western Cape should be notified;

- The size of the turbines precludes proposing a feasible buffer on either side of the scenic R43. No mitigation is possible;

- The impact of the turbines on the Cultural Landscape will be very high and no mitigation is possible.

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## ABBREVIATIONS

| | |
|---|---|
| ESA | Early Stone Age |
| GPS | Global Positioning System |
| HIA | Heritage Impact Assessment |
| HWC | Heritage Western Cape |
| LSA | Later Stone Age |
| MSA | Middle Stone Age |
| NHRA | National Heritage Resources Act, No 25 of 1999 |

# GLOSSARY

**Archaeology:** Remains resulting from human activity which is in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

**Early Stone Age:** The archaeology of the Stone Age between 700 000 and 250 000 years ago.

**Fossil:** Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

**Heritage:** That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act No 25 of 1999)

**Late Stone Age:** The archaeology of the last 20 000 years associated with fully modern people.

**Middle Stone Age:** The archaeology of the Stone Age between 300 000 and 20 000 years ago associated with early modern humans.

**Palaeontology:** Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

**Structure (Built Environment):** Any building, works, device or other facility made by people and which is fixed to land, and which includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.

# 1 INTRODUCTION

ACO Associates was appointed by Arcus GIBB (Pty) Ltd on behalf of the proponent to conduct a Heritage Impact Assessment of a number of farms positioned between Botrivier and Caledon in the Overberg area of the Western Cape (Figure 1). The total wind farm will be approximately 3500 hectares in extent, have a generating capacity of 300 MW and comprise 150 turbines installed in 6 phases. This HIA considers the first two phases with a total of 70 turbines.

The farms which are considered for the first two phases are:

De Vleytjies 261
Farm 744
Goedvertrouw 264
Hawston View 270
Hawston View 271
Farm 749
Riet Fontein 259
Warmoeskraal 263
Windheuwel 354

## 1.1 Background

The Scoping study for this project was undertaken by the Archaeology Contracts Office in November 2009. The Scoping involved a brief site visit with other specialists and a desktop review of the literature for the general area. Recommendations were included for the EIA phase.

### 1.1.1 The proposal

According to the background information supplied by Arcus Gibb, the turbines are proposed to be positioned over an area of approximately 3500 hectares between Botrivier and Caledon in the Overberg area of the Western Cape. It is projected that the wind farm will have a generating capacity of 300 MW and comprises 150 turbines installed in 6 phases. This HIA considers the first two phases with a total of 70 turbines.

- Up to 70 wind turbines (including tower foundations).
- Internal access roads from the R43 to the operations area.
- Transmission line from a point on the proposed wind farm connecting to the national grid through the nearest existing Transmission lines within the proposed study area (Parcel No. 1/264).
- Underground/overhead (to be determined) cables to carry electricity from the turbines to the project sub-station, then to the existing overhead transmission lines within the project boundaries.
- Substation at the connection point to the existing transmission lines.
- Control center compound in an existing building in Caledon.
- Upgrade of the Houwhoek Substation to accommodate the additional capacity

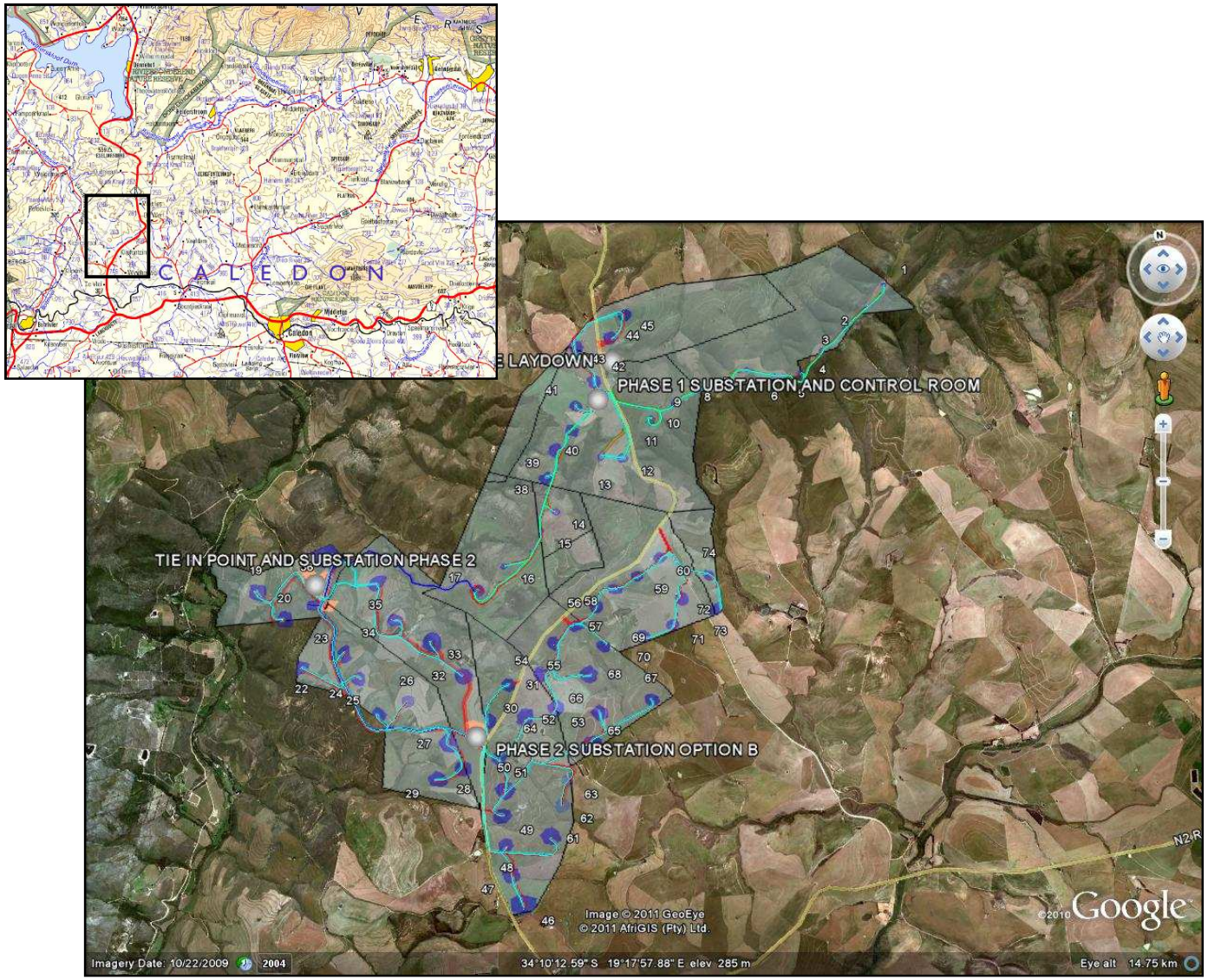


Figure 1: Location of the Study Area (1:50 000 map for the area showing boundaries of the farms to be inserted here).

The wind farm will be integrated with the national transmission system via new transmission lines and a substation will be constructed at the point where the transmission lines will connect with the existing transmission lines.

While the specifications have yet to be determined, each turbine typically consists of a concrete foundation on to which a steel column is bolted. Each column will be between 80 m and 100 m high. On top of each column is the nacelle which contains the generator and gear box. The generator is powered by the wind driven motor, the blades of which can be up to 45 m in length. Turbines will be optimally positioned to make the most of ambient wind conditions, but generally spaced several hundred metres apart. At present studies are ongoing to determine the optimal location for the turbines and Figure 2 is the most recent projection for their positions. Since wind turbines utilize such a small portion of the land surface, once the facility is established, normal agricultural activities can take place on the land.

## 1.2 Scope and Limitations

During the Scoping Phase a single visit of one day was undertaken by Tim Hart of the Archaeology Contracts Office. The Heritage Impact Assessment involved a second site visit of two days by David Halkett and Lita Webley and the collection of primary and secondary literature sources for the general area.

### 1.2.1 Limitations

- The time delay between the Scoping Assessment and HIA process meant that continuity with regard an understanding of the area was lost;
- Although the number of turbines was reduced from 150 to 70 for the purposes of this study, the size of the property was extended from 1400 ha to 3500 ha and this could not be subjected to a comprehensive survey;
- There were a number of alterations to the turbine positions during the course of the study and the present study reflects an approximation of the final turbine positions;
- There were no significant physical limitations as all turbine and substation locations were accessible on foot.

## 1.3 Methodology

This study has been commissioned as the heritage component of an EIA. It assesses the identified range of impacts in terms of accumulated knowledge of the area. The source of information that is used for this process is based on scientific publications related to archaeological work undertaken in the Study Area and other unpublished reports on the history of the region. A survey of heritage resources has been conducted on site and heritage indicators (conservation-worthy buildings, archaeological sites and places celebrated as heritage) identified and mapped where appropriate. Definitions of heritage and criteria for assessment of heritage are indicated in the National Heritage Resources Act while the Provincial Guidelines for assessing heritage in the Western Cape applies. Both the NHRA and Provincial Guidelines require that cultural landscapes and areas of particular aesthetic and/or cultural heritage significance are included in the assessment.

During the two day field trip we visited the sites of all the proposed substations. We undertook a drive down of some 95% of access roads and cable routes. We were able to physically examine the locations of approximately 60 of the 70 turbines. All routes and tracks were recorded on a handheld Garmin GPS receiver (set to WGS84 datum). Walk paths and site locations were recorded and finds were photographed and described. The walk paths are not shown in Figure 2 below, as they would merely complicate the illustration. The walk paths will be made available to Heritage Western Cape if required. An independent visual assessment forms part of the EIA specialist studies.

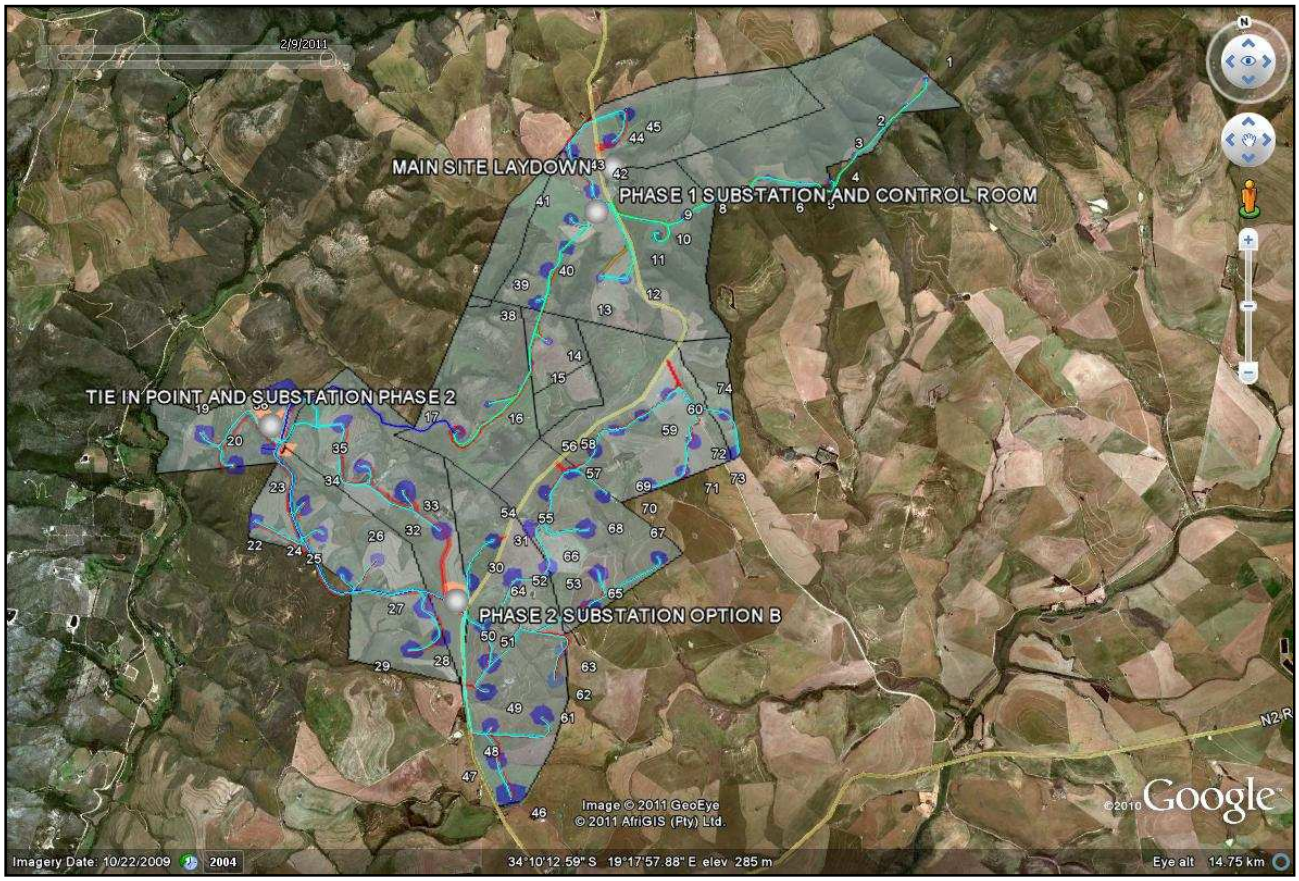


**Figure 2:** The proposed Caledon wind farm on either side of the R43 (shown as yellow). The laydown areas for the turbines are shown as blue patches, the access roads as red lines and the underground cables as a turquoise colour.

### 1.3.1 Study Area Sensitivity Analysis

It is important to note that "Heritage places are scarce, finite, non-renewable and valuable" (Spenneman 2006:7). Communities preserve them because they form a link with the past but they are not only tangible expressions of the past, they "provide emotional anchors for the community as a whole". Heritage sites cannot be renewed once they have been destroyed.

Sensitivity criteria are explained in Table 1 below.

## 1.4 Regulatory and Legislative context

The basis for all heritage impact assessment is the National Heritage Resources Act 25 (NHRA) of 1999, which in turn prescribes the manner in which heritage is assessed and managed. The National Heritage Resources Act 25 of 1999 has defined certain kinds of heritage as being worthy of protection, by either specific or general protection mechanisms. In South Africa the law is directed towards the protection of human made heritage, although places and objects of scientific importance are covered. The National Heritage Resources Act also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. Generally protected heritage which must be considered in any heritage assessment includes:

- Cultural landscapes (described below)
- Buildings and structures (greater than 60 years of age)
- Archaeological sites (greater than 100 years of age)
- Palaeontological sites and specimens
- Shipwrecks and aircraft wrecks
- Graves and grave yards.

Section 38 of the NHRA requires that Heritage Impact Assessments (HIA's) are required for certain kinds of development such as rezoning of land greater than 10 000 sq m in extent or exceeding 3 or more sub-divisions, or for any activity that will alter the character or landscape of a site greater than 5000 sq m.

### 1.4.1 Cultural Landscapes

*Section 3(3) of the NHRA, No 25 of 1999 defines the cultural significance of a place or objects with regard to the following criteria:*

(a) its importance in the community or pattern of South Africa's history;
(b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
(c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
(d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
(e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
(f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
(g) its strong or special association with a particular community or cultural group for social cultural or spiritual reasons;
(h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
(i) sites of significance relating to the history of slavery in South Africa.

### 1.4.2 Scenic Routes

While not specifically mentioned in the NHRA, No 25 of 1999, Scenic Routes are recognised by DEA&DP as a category of heritage resources. In the DEA&DP Guidelines for involving heritage specialists in the EIA process, Baumann & Winter (2005) comment that the visual intrusion of development on a scenic route should be considered a heritage issue. This is also given recognition in the Notice of Intent to Develop (NID) application which is used by Heritage Western Cape.

### 1.4.3 Heritage Grading

Heritage resources are graded following the system established by Winter and Baumann (2005) in the guidelines for involving heritage practitioners in EIA's (Table 1).

**Table 1:** Grading of heritage resources (Source: Winter & Baumann 2005: Box 5).

| Grade | Level of significance | Description |
|---|---|---|
| 1 | National | Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources. |
| 2 | Provincial | Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources. |
| 3A | Local | Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3A heritage resources. |
| 3B | Local | Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources. |
| 3C | Local | Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources. |

### 1.4.4 Wind Energy Guidelines

A pilot study commissioned by the Provincial Government of the Western Cape "Towards a Regional Methodology for Wind Energy Site Selection in the West Cape region" (May 2006) is the only locally available draft policy guideline. The study looked at landscape character rather than at the "cultural landscape" or "heritage" but concluded that wind energy facilities can have a profound impact on the landscape in terms of quality of place. In general terms it recommends a buffer of at least 500 m from heritage sites. Neither SAHRA nor HWC have developed policies with respect to heritage and renewable energy and therefore the issue of distance of wind turbines from heritage resources has not been resolved.

# 2 DESCRIPTION OF THE RECEIVING ENVIRONMENT

The area identified for the wind farm is situated in the rolling wheat lands of the Overberg between Caledon and Botrivier. The wind farm straddles the R43 which connects the N2 highway with the town of Villiersdorp (Figure 1). The wind farm is bounded to the north by the Riviersonderend valley, to the west by the Botrivier valley, to the east by farms, including Boontjieskraal, and to the south by the N2 highway. The terrain consists of undulating wheat lands, interspersed with groves of blue gums trees indicating the presence of homesteads, and occasional avenues of blue gum trees line some farm roads. During our survey in February, prior to the commencement of winter rains, the landscape comprised different hues of brown and beige.

**Plate 1:** View from the study area toward Villiersdorp, showing a typical Overberg landscape. Note the brown wheat fields, the valleys which have retained some indigenous vegetation, the groves of trees associated with farmsteads.

## 2.1 Archaeological and Historical Overview

Prior to the arrival of the Dutch, the Overberg area was occupied by San hunter-gatherers who inhabited caves and settled in open sites. Archaeological evidence indicates that they were the original inhabitants of the area and their ancestors occupied the region for more than 30 000 years. There are also archaeological and historical sites which relate to the Khoekhoe who occupied large areas of this region from around 2000 years ago. They were a pastoralist people with sheep and cattle. The groups living around Caledon were apparently the Chainouqua (Elphick 1985). They traded livestock with the Dutch East India Company or VOC outposts such as Soetmelksvlei and Tygerhoek (on the Riviersonderend River) in exchange for colonial items. Gradually, European stock farmers and professional hunters and traders moved into the area.

After 1704 free burgers were allowed to barter for livestock with the Khoekhoe. The system of loan farms was introduced in 1723 and this gave colonists exclusive grazing rights as far as the upper Breede River. Quitrent tenure was introduced in 1732. By the 18$^{th}$ century the VOC began to “formalise” the granting of farms in the

area. An examination of the 1:50 000 maps for this area shows many of the farms in the Overberg have circular boundaries, a remnant of the 18th century when the extent of the farm boundaries was determined from a central spot, a "walking off" distance that resulted in a circular farm of around 3000 morgen (Malan & Harris 1999).

For example, portions of the farm Rietfontein 259 which is part of the study area, originates from a much larger circular farm according to the survey map of 1833 (SG No 402/1833), but has subsequently been sub-divided into a number of smaller farms (Figure 3). Similarly Farm 749 (Figure 1) also contains the remnants of an earlier circular farm.

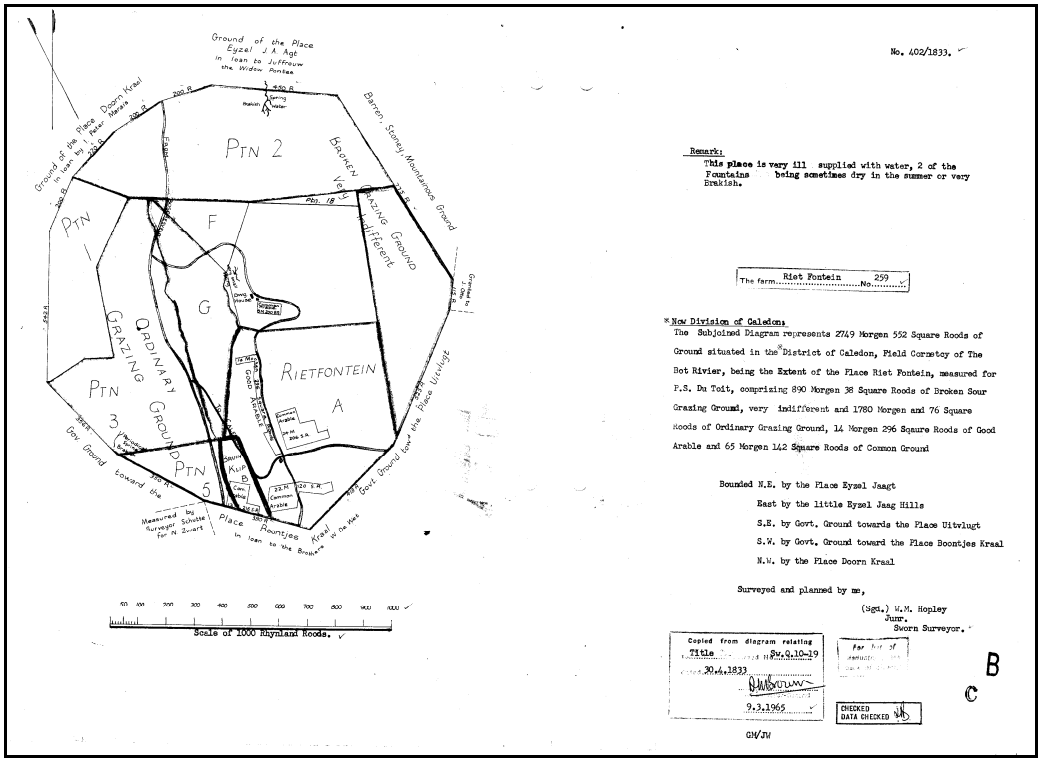


**Figure 3:** The circular shape of the original Rietfontein 259 (SG No 402/1833) property dates back to earlier land use patterns.

By the mid 18th century European stock farmers were distributed across the landscape and the Khoekhoe, who had been using the coastal plains to graze their livestock were gradually forced out of the most desirable areas. Their numbers were decimated by smallpox and by the mid 19th century their social structure had collapsed and they were living on mission stations (such as Genadendal in the Riviersonderend Valley) or they had become employed on farms.

Many of the farms in the Overberg, such as Boontjieskraal on the N2 between Botrivier and Caledon, have well-preserved historical features, some of which are still in daily use. The vernacular architecture of the area is characterised by white-washed cottages with thatched roofs. Building materials include clay mixed with grass. Lime and shell were burnt as binding material. Reeds were used for thatch and "spaanseriet" for the ceilings.

Villages and farms were connected by various wagon routes and sections of these roads are still visible in certain places. The main route over the Overberg ran from the

present Sir Lowry's Pass down Houw Hoek to the farm Boontjieskraal near Caledon where it split into two. The inland route went passed Genadendal and Greyton to Riviersonderend. In 1711 almost all farms along this route (including Botrivier and Boontjieskraal) were owned by Governor WA van der Stel. Oak and popular trees were planted at overnight stops along the wagon roads, resulting in further alteration to the landscape.

# 3 FINDINGS

## 3.1 Palaeontology

The ACO offices was informed by two palaeontologists that there was little likelihood of any fossils in the decomposing shales.

## 3.2 Pre-colonial archaeology

Previous archaeological consultancy work in the Overberg confirms the presence of scatters of stone tools in ploughed lands toward the Swellendam area (Webley & Orton 2009; Webley 2010). Kaplan (1990) reported on scatters of Early and Middle Stone Age implements, made predominantly on quartzite, in ploughed fields outside of Riviersonderend. He concluded that the sites had been disturbed and the artefacts were no longer in primary context. According to the SAHRA database (2009) there are no reported reports for the area between Caledon and Botrivier.

A number of scatters of Early Stone Age material were found on the ploughed lands of the study area (Appendix 1). The stone tools included quartzite flakes, flaked cobbles, cores including discoid cores, and some crude bifaces (handaxes). A few were found on a fine-grained raw material, presumably a silcrete. An independent visual assessment forms part of the EIA specialist studies.

**Plate 2**: Site 3

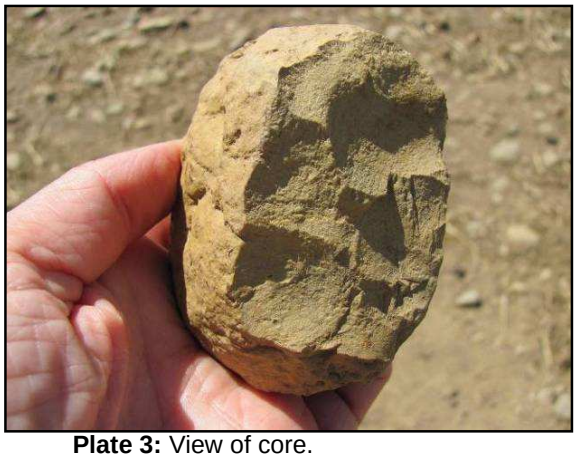

**Plate 3:** View of core.

**Plate 4:** Flakes from Site 9.

**Plate 5**: A handaxe from Site 9.

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Macfarlane made the following observation as early as 1949: "*I have examined the high-level gravels at Napier, Swellendam and Riversdale and every deposit examined by me contains stone implements of a well-developed Pre-Stellenbosch culture of principally a Cromerian facies*" (Macfarlane 1949:95-6). He noted "Handaxes are not common; they are usually flaked on one surface, the dorsal plane being left intact" (Macfarlane 1949: 96). There is some disagreement as to whether this industry pre-dates the Acheulian or is contemporary with it.

## 3.3 Colonial Archaeology

Although there are a few farmsteads in the study area, no historical archaeological material was recovered during the surveys of the turbine positions, access roads, laydown areas or substations.

## 3.4 Colonial Period Heritage

It is known that this area was settled by European colonists from the early 18th century. Prior to the survey, it was anticipated that a number of historic farm structures would be identified. The following homesteads which fall within the study area, namely Vleitjies, Klein Klipfontein, Klein Windheuwel, Witkop and Hawston View were examined.

### 3.4.1 Vleitjies

The main laydown area will be located behind the farm house, while the Phase 1 substation and control room will be situated across the R43 some 500m from the farm house (Figure 3). The house has an avenue of blue gums running along its eastern and southern margins, and a grove of blue gums shields the house from the R43. Apart from the farmhouse, which dates to 1907, there is also a modified shed. The closest turbine, number 42, is located 300m from the house.

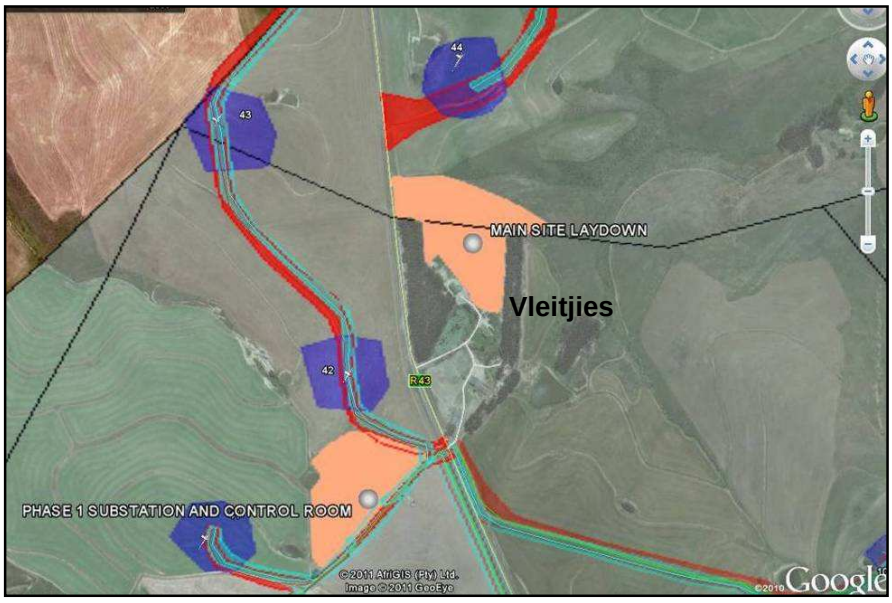


**Plate 6:** View of the farm Vleitjies. The laydown area lies behind the house while the Substation and Control room for Phase 1 is located some 500m to the west of the house.

**Plate 7:** The main farmhouse at Vleitjies which dates to 1907. The windows have been replaced and only some original features remain.

### 3.4.2 Klein Klipheuwel

The house on Riet Fontein 259 is called Klein Klipheuwel. No information is available on the house. It appears to have been constructed recently, but may represent an older house which has been substantially remodelled. The adjacent family graveyard contains graves dating to the early 20th century. The closest turbine to the farm house is some 400m distance.

**Plate 8:** The main farmhouse at Klein Klipheuwel.

### 3.4.3 Klein Windheuwel

This farmhouse on Windhuewel 354 is called Klein-Windheuwel. According to the owner of the farms Riet Fontein 259 and Windheuwel 354, the parent farm was Windheuwel and the main Windheuwel farmhouse is outside the wind farm. The house dates to 1928 and retains much of its original fabric. The house is abandoned and is badly dilapidated. Turbine 54 is located some 100m from the farmhouse.

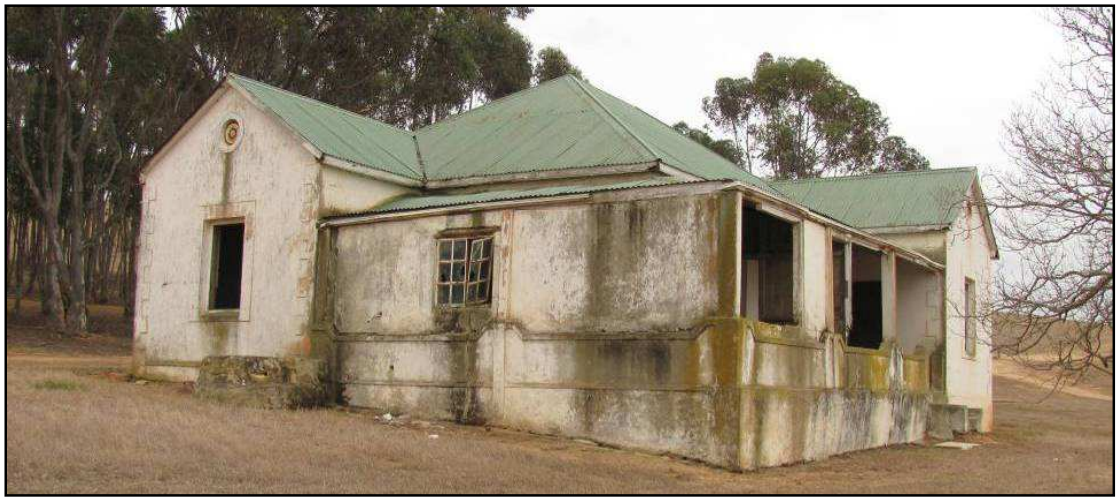

Plate 9: The abandoned Klein-Windheuwel farm house on the farm Windheuwel.

### 3.4.4 Witkop and Hawston View

There are two farmhouses on the farm Hawston View 270 and 271. Both were built after 1961 as the sub-division of the original farm only occurred at this time. The Phase 2 substation option B, is located approximately 1.1 km from Witkop farmhouse, while Turbine 32 is located 200m from the house. The closest turbine to the Hawston View farmhouse is T26 at 430m.

## 3.5 Graveyard

According to the 3 owners of the farms which make up the proposed wind farm, there is only one graveyard in the study area and it is situated on Riet Fontein 259, next to the Klein Klipheuwel farmhouse. The graveyard is located in a grove of blue gum trees and is surrounded by a low “ring muur” comprising dry stone walling, surmounted with mud brick and covered in plaster. The corners and entrance to the cemetery wall have raised piers/cornices. There are approximately 16 graves in the cemetery but only three have marble headstones. The others are covered in packed stone. The graves are those of S Lotter (deceased 1924), Hendrik de Wet (deceased 1914) and Susanna de Wet (deceased 1901) on a single headstone, and Susanna Lotter (1899) and Mattheus Lotter (deceased 1919) on a single headstone. The graves all date to the early 20$^{th}$ century.

The closest turbine to the family graveyard is located some 390m away (Turbine 58).

**Plate 10:** View of a grave at the Klein Klipheuwel family graveyard.

## 3.6 Cultural Landscape and Scenic Routes

The cultural landscape comprises typical Overberg wheat fields and pasture lands, characterised by rolling landscapes, ploughed lands and blue gum tree lines and wind breaks. The hills dip down to small river valleys, some of which are covered in indigenous vegetation. The R43 winds from N2 up to Villiersdorp over the highest ridge in the study area. It runs in an east-west direction on Farm 744. The ascent of this ridge is a pass called “Floorshoogte”. There are views toward Theewaterskloof and the Riviersonderend valley to the north (Plate 11), to the west the Botrivier valley (Plate 13) which is under intensive irrigation, and to the south the N2 with Caledon just and sea just visible on a clear day (Plate 12).

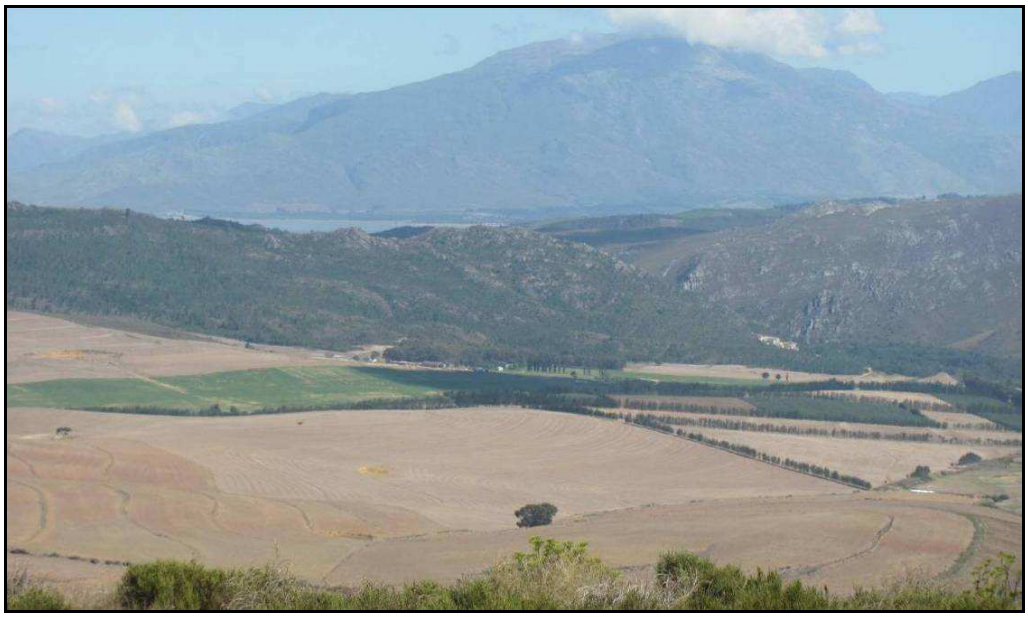
**Plate 11:** View from the highest ridge on the wind farm to the Riviersonderend Valley and Theewaterskloof visible between the mountain ranges.

**Plate 12:** View from the ridge to the south-east, with Caledon visible in the distance.

**Plate 13:** View of the Botrivier valley to the south-west from Turbines 19 and 20.

The turbines will be visible from a number of scenic routes in the area. This includes the R43 to Villiersdorp, the road through the Riviersonderend valley to Genadendal and Greyton, and the gravel road through the Botrivier valley.

The backdrop to the rolling agricultural lands is a number of mountains including the Riviersonderend Mountains, Groenland Mountains and Kleinrivierberge.

# 4 IMPACTS AND ISSUES IDENTIFICATION

A discussion is presented below on the anticipated impact of the construction of the turbines, substations, access roads and under ground cabling on the heritage aspects of the study area. The impact of the transmission lines connecting the substations to the existing transmission lines which cross the western section of the study area are not considered significant. This is because they will not be crossing the R43, and they will not be a new addition to the landscape. They will be out of view of the R43.

## 4.1 Pre-colonial and Colonial Archaeology

The Early Stone Age stone tools which have been recorded (Appendix 1) during this survey are widely scattered across the landscape and have been found in a number of ploughed fields. There seems to be no specific pattern to the distributions. The artefacts are often found on the tops of hills, a considerable distance from the closest source of water. No distributions were observed close to stream or river beds.

The nature of the impact: The construction of the turbines and substations, and the excavation for roads and trenching for underground cabling will result in the physical disturbance of these tone tools and their context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that while deep trenching or excavations may expose archaeological artefacts, the artefacts are relatively meaningless when removed from the area in which they were found. Large scale excavations will damage archaeological sites and the construction of roads and laydown areas can result in high levels of impact.

However, while some artefacts were found in ploughed lands in proximity to proposed turbine positions, it is important to emphasise that these artefacts have been subjected to the actions of ploughing for at least 200 years. The stone tools are unlikely to be in the location where they were discarded several hundred thousand years ago (i.e. *in situ*).

Nevertheless, it is known that ploughing only impacts on the top 60cm of the soil and there is therefore the possibility that deeply buried material, which may be in its original context, may be uncovered during the deep excavations for the turbine bases.

The extent of the impact: It is known that these ESA distributions are widespread. However, the variability in the artefact morphology and the density of distributions is not known. Therefore, while the impact of the proposed wind farm on the archaeology of the area will be of a local nature, it is possible that local distributions may inform on regional patterns.

Since archaeological sites are non-renewable, the duration of impact of a development is generally permanent. The impact of the development is also not reversible. Our confidence with regards the potential negative impact is high in view of the number of archaeological scatters which were found during the survey.

A general significance rating for the scatters of ESA stone tools would be: Low.

**Table 2**: Impact Assessment on Pre-Colonial and Colonial Archaeology

| Impact | Nature | Intensity | Extent | Duration | Probability | Confidence |
|---|---|---|---|---|---|---|
| Before Mitigation | Negative | Low | Local | Long Term | Highly probable | High |
| After Mitigation | Neutral | Negligible | Local | Long Term | Highly Probable | High |

## 4.2 Colonial Period Heritage

Historic structures are sensitive to physical damage such as demolition as well as neglect. They are also context sensitive, so that changes to the surrounding landscape will affect their significance. No direct impacts are anticipated with regards the five farm stead complexes described and illustrated above.

The farm Vleitjies is situated next to the R43. The farmstead will be in closest proximity to the wind farm infrastructure as the main laydown area for Phase 1 will occur immediately behind the farm house (Figure 3). Further, turbine 42 and the substation for Phase 1 will be in the direct line of site of the main house (Plate 7). The infrastructure associated with the wind farm will impact negatively on the significance of the farm and its rural setting. This impact will be of a local nature.

The farm Klein Klipheuwel is set off the R43 and is hidden from view by a large plantation of blue gum trees. It is not anticipated that the turbines will impact negatively on the complex of farm buildings. The impact will be local.

The farm Klein-Windheuwel is located off the R43 and is hidden from view by a grove of blue gums. This house has retained many of its early 20$^{th}$ century architectural attributes but it is no longer occupied and has been neglected. The significance of the house is moderate and the construction of a turbine only 100m from the house will impact negatively on its general landscape context. Further, this house is also vulnerable to the vandalism, particularly if construction crews are living in the vicinity.

The farms Witkop and Hawston View are located off the R43 on the Hawston View gravel road. While Turbine 32 will be constructed within 200m of the farm house on Witkop, the house has low heritage significance and the impact will be low. The owner of the property is in favour of the development.

The duration of the impact on the built environment will be of a Long Term nature as it will continue for the life span of the project. The impact is reversible. Once the turbines are removed, the status quo will return. In general, the significance rating for the built environment is Low with the exception of the Klein Windheuwel farmstead.

**Table3**: Impact Assessment on Colonial Period Heritage

| Impact | Nature | Intensity | Extent | Duration | Probability | Confidence |
|---|---|---|---|---|---|---|
| Before Mitigation | Neutral to Negative | Medium | Local | Long Term | Probable | Medium |
| After Mitigation | Neutral | Low | Local | Long Term | Probable | Medium |

## 4.3 Graveyards

There is a single family graveyard on the farm Klein Klipheuwel. It has a high significance value. However, the graveyard is not threatened by the development of the wind farm.

Graveyards and burials are considered to have high significance because of their possible association with individuals or groups or communities who may consider them of spiritual or cultural importance (Section 36 of the National Heritage Resources Act, No 25 of 1999). This significance rating may only be reduced if it is proved that the descendants do not consider the graves/graveyard of importance. It is preferable that a buffer is instituted between a graveyard and development, as on occasions graves have been found outside the cemetery walls.

There will be no direct impact on the existing cemetery.

**Table 4**: Impact Assessment on Graveyards

| Impact | Nature | Intensity | Extent | Duration | Probability | Confidence |
|---|---|---|---|---|---|---|
| Before Mitigation | Neutral | Low | Local | Long Term | High | High |
| After Mitigation | Neutral | Low | Local | Long Term | High | High |

## 4.4 Cultural Landscape and Scenic Routes

Wind Energy Facilities are a new phenomenon in South Africa and have been receiving positive publicity because of South Africa's current energy crisis. However, the proliferation of wind energy facilities in South Africa in the absence of heritage guidelines or policy is a cause for concern; particularly with regard their cumulative impacts (Figure 4). Wind energy facilities require vast amounts of landscape and may therefore have a significant impact in terms of potential loss of iconic vista and landscape character change.

In terms of the nature of the impact, it is important to note that cultural landscapes are highly sensitive to large scale development activities that change the character of a place. The proposed construction of several large wind farms in the area is likely to result in profound changes to the sense of place, not only of the local environment, but also of the Overberg region (Figure 4). The intrusion is essentially a visual intrusion that is difficult to measure due to the fact that there is little reference material.

Thus, while the impact may be considered local in terms of physical extent, there may be wider implications in terms of a sense of place or the identity of the region and the impact this may have on tourism. One thinks here of the scenic drive through the Riviersonderend valley to Genadendal and Greyton which will be negatively impacted.

The duration of the impact will be for the life of the project, in other words around 25 years. The impact is reversible if the turbines are removed after the end of the project. The likelihood that the impact will occur is definite and the confidence level is high.

The cultural landscape and scenic routes have high significance and therefore the impact will be high.

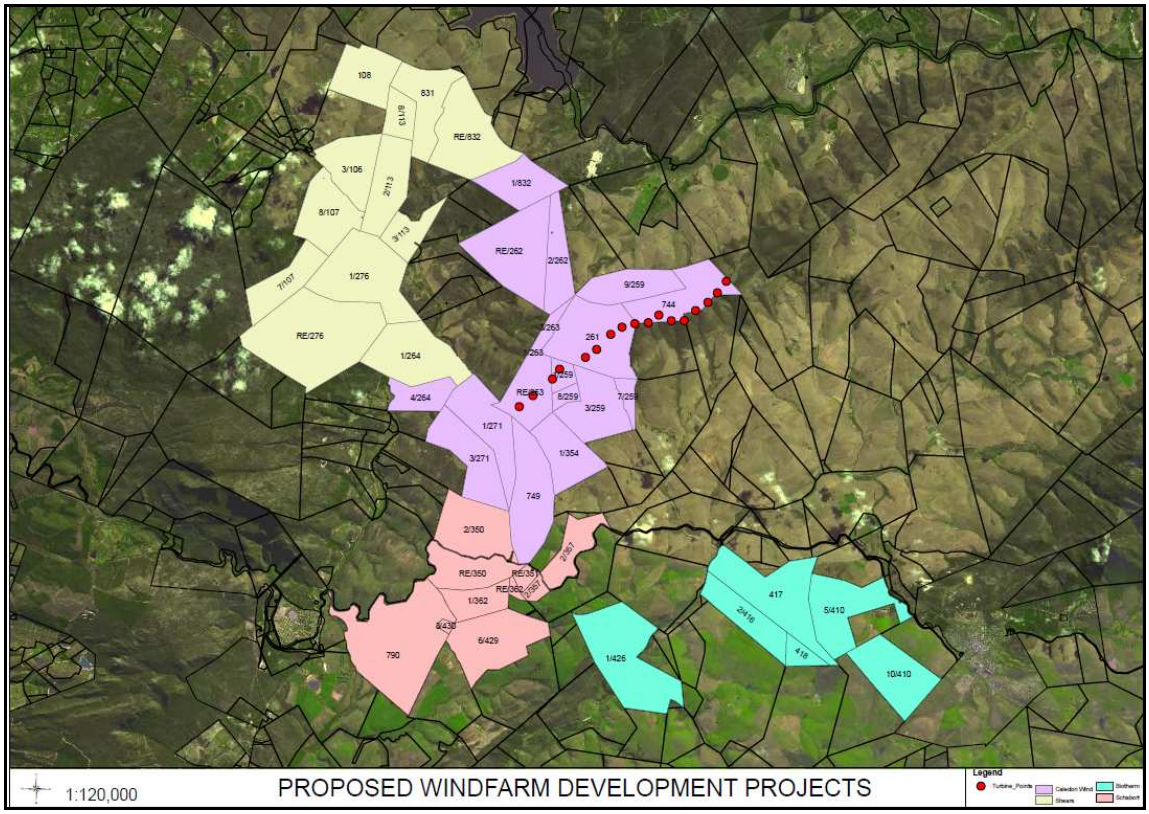


**Figure 4:** Proposed wind farm development in the Caledon and Botrivier area. The current study is reflected in portions of the mauve area.

**Table 5**: Impact Assessment on Cultural Landscapes and Scenic Routes

| Impact | Nature | Intensity | Extent | Duration | Probability | Confidence |
|---|---|---|---|---|---|---|
| Before Mitigation | Negative | High | Local – surrounding area | Long Term | Definite | High |
| After Mitigation | Negative | High | Local – surrounding area | Long Term | Definite | High |

# 5 MITIGATION

## 5.1 Pre-colonial and colonial Archaeology

The potential impact of the wind turbines and associated infrastructure has been discussed above.

Avoiding the ESA stone artefact scatters does not seem a feasible option. The scatters are widespread and presumably also occur beneath the soil surface.

Mitigation, in the form of archaeological excavations or test excavations have not been the norm for surface scatters of stone tools found elsewhere in ploughed lands in the Overberg area. For example, Kaplan (2009) did not propose mitigation for the surface scatters of Early and Middle Stone Age tools which he found in ploughed lands in the Riviersonderend valley. Similarly, Webley and Orton (2009) did not recommend mitigation for stone tools found in ploughed lands at Heidelberg. It is important to note, that even if mitigation in the form of excavations were undertaken, the site would still be destroyed.

Test excavations which emphasise context would not seem the route to follow. However, a detailed photographic record of artefact types in a limited area may provide valuable information for future researchers interested in ESA variability. For this reason, it is proposed that such a photographic record (where the artefacts are not collected but left on site) should form part of the EMP.

## 5.2 Colonial Period Heritage

The potential impact of the wind turbines and associated infrastructure has been discussed above.

While some of the turbines will be located in close proximity (up to 200m) to existing farmhouses, none of the farmhouses (with the exception of Klein Windheuwel) have high heritage significance. Further, the owners of the property are in favour of the wind farm. With regard Klein Windheuwel, two possible suggestions are made with regard mitigating the potential impact of constructing a turbine and associated infrastructure in close (100m) proximity to the abandoned house. The property is fenced to prevent access by construction workers and the associated potential for vandalism. Alternatively, the property is upgraded and used for accommodation during the construction phase. If the latter option is followed, then guidelines for the upgrading should be obtained from Heritage Western Cape, in order to comply with guidelines for buildings older than 60 years. This would be the preferred option and would be a possible positive benefit arising from the wind farm.

## 5.3 Graveyards

There is no anticipated impact on the family graveyard on Klein Klipheuwel. If however, any human remains are uncovered anywhere in the study area during the

construction phase, work in that area should cease immediately, and Heritage Western Cape should be contacted.

## 5.4 Cultural Landscape and Scenic Routes

The potential visual impact of the wind turbines and associated infrastructure has been discussed above. The discussion here should be considered together with that presented in the Visual Impact Assessment.

The Overberg landscape, with it rolling hills, has the potential to accommodate wind farms which are judiciously placed so that they do not impact negatively on scenic vistas or scenic routes.

In this regard it is noted that the position of the wind farm on the R43 means that it will be visible from Houw Hoek Pass, from the N2, from Caledon, from the Riviersonderend Valley and the Botriver Valley. In some places the turbines will be so distant that they will have limited impact.

However, the R43 is an important gateway to the Riviersonderend Valley and significant heritage resources such as Genadendal and Greyton. The size of the turbines precludes proposing a feasible buffer on either side of the R43. No mitigation is possible.

Similarly, the visual impact of Phase 2 Substation Option 2, which will be located next to the R43, will have a high negative value for motorists. Option 1 is preferred as it is further from the road.

The impact of the transmission lines, which will feed into existing transmission lines which cross the western portions of the study area, are likely to be minimal on the landscape. This is because there are already existing power lines in the area, and they run out of sight of the R43.

# 6 CONCLUSIONS AND RECOMMENDATIONS

The impact of the proposed wind farm, comprising two phases with a total of 70 wind turbines, two substations as well as access roads, underground cabling and transmission lines to the national electrical network, on the heritage of the area has been outlined above.

## 6.1 300 MW Windfarm

### 6.1.1 Pre-colonial and Colonial Archaeology

Scatters of Early Stone Age material occur across many of the ploughed fields. They are not in context and are of low significance:

- It is proposed that a photographic record of a limited collection of the ESA artefacts is undertaken as part of the EMP programme.

### 6.1.2 Colonial Period Archaeology

There are 5 homesteads within the borders of the wind farm. Four are occupied while one is abandoned. The occupied farm houses have been modernised and retain little original fabric, they have low heritage significance. The early 20$^{th}$ century, abandoned, farmhouse (Klein Windheuwel) which is in a state of neglect, has medium significance:

- No mitigation is proposed for the farmsteads. However, in order to prevent vandalism of the abandoned farmhouse of Klein Windheuwel, it is recommended that the house is fenced off during the construction phase. Alternatively, the developers may consider upgrading the structure for accommodation for the construction crews but this should be according to Heritage Western Cape guidelines for buildings over 60 years.

### 6.1.3 Graveyards

There is one early 20$^{th}$ century cemetery within the wind farm, at Klein Klipheuwel. It is close to the farmhouse and is not threatened by the development:

- No mitigation is required for the family graveyard. However, if burials are uncovered during the excavation for the turbines, access roads, etc then work should cease in that area and Heritage Western Cape should be notified.

### 6.1.4 Cultural Landscape and Scenic Routes

The wind farm is located on either side of the R43 (a scenic route) to Villiersdorp. This is an important access route to the Riviersonderend Valley and the historic villages of Genadendal (Provincial Heritage Site) and Greyton. The proposed wind farm will also be visible from the Houw Hoek Pass, the N2, Caledon and Theewaterskloof. At least 19 turbines, which can reach a height of 120m with their blades, will be placed within 350m of the R43:

- The size of the turbines precludes proposing a feasible buffer on either side of the scenic R43. No mitigation is possible.

The cultural landscape comprises typical Overberg wheat fields and pasture lands, characterised by rolling landscapes, ploughed lands and blue gum tree groves and wind breaks. The Riviersonderend Mountains, Groenland Mountains and Kleinrivier Mountains form an important backdrop to the agricultural lands. The most significant heritage impact will be of visual nature. The cumulative impact of four adjoining wind farms in the Caledon area will be high:

- The impact of the turbines on the Cultural Landscape will be very high and no mitigation is possible.

## 6.2 Substation Locations

There are no significant impacts with regard the placement of the Phase 1 substation. However, Phase 2 substation option B is located next to the R43 and will have a high, negative impact on the R43 scenic route and the option A is preferred.

## 6.3 Transmission Line

The impact of the transmission lines connecting the substations to the existing transmission lines which cross the western section of the study area are not considered significant. This is because they will not be crossing the R43, and they will not be a new addition to the landscape. They will be out of view of the R43.

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**APPENDIX 1**: Heritage Sites Identified during survey

| Site Name | GPS Co-ordinates | Description | Significance |
|---|---|---|---|
| A1 | S 34 07 58.0<br>E 19 17 44.6 | A single quartzite handaxe (ESA) located close to a recent stone navigation beacon. | Low |
| A2 | S 34 09 24.9<br>E 19 17 08.0 | A quartz flake, silcrete blade and quartzite cobble on top of koppie in Renosterved – near T 14a | Low |
| A3 | S 34 09 26.3<br>E 19 17 09.9 | Quartzite flakes, cores both discoid and irregular, some bifacial elements incl 2 handaxes (1 on cobble, 1 on flake) | Low |
| A4 | S 34 09 27.4<br>E 19 17 10.5 | Quartzite flakes, cores both discoid and irregular. Some quartz chunks. | Low |
| A5 | S 34 09 28.3<br>E 19 17 09.0 | Quartzite flakes, cores both discoid and irregular. Some quartz chunks | Low |
| A6 | S34 09 28.4<br>E19 17 08.2 | 1 flaked hammerstone, 1 broken fine-grained quartzite lower grindstone | Low |
| A7 | S 34 10 33.1<br>E 19 17 32.1 | ESA scatter near T69. A few silcrete cores, cores and flakes on quarzite | Low |
| A8 | S 34 10 11.5<br>E 19 18 35.0 | Scatter of ESA artefacts near T55 | Low |
| A9 | S 34 12 11.7<br>E 19 16 47.7 | On route to T61. ESA flakes and 1 bifacial element | Low |
| Graveyard | S 34 10 17.9<br>E 19 17 41.0 | Klein Klipheuwel, family graveyard. At least 16 graves, 3 with marble headstones, others unmarked. Dating to early 20$^{th}$ century. Surrounded by “ring muur”, with packed stone walling. | High |